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PII: S0947-3580(17)30102-4
DOI: 10.1016/j.ejcon.2017.06.002
Reference: EJCON 217

To appear in: *European Journal of Control*

Received date: 21 March 2017
Revised date: 25 May 2017
Accepted date: 19 June 2017

Please cite this article as: Liubao Deng, Yuefen Chen, Optimal control of uncertain systems with jump under optimistic value criterion, *European Journal of Control* (2017), doi: 10.1016/j.ejcon.2017.06.002

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Abstract

Based on uncertainty theory, a new optimistic value model of uncertain optimal control for uncertain dynamic systems with jump is established. The principle of optimality is proposed and the equation of optimality is obtained for presented model by employing the dynamic programming method. As an application, an optimal control problem of pension fund is discussed to verify the validity of the proposed method.

Keywords: Optimal control; uncertainty; optimistic value; jump; pension fund

1 Introduction

Optimal control of systems with jump is one of the most important classes of optimal control. In practice, some external extreme events or noises have a large impact on control system. The stochastic differential equations driven by geometric Brownian motions and Poisson random jumps are usually used as popular tools to describe stochastic jump diffusion system in various areas, especially in finance. Since Merton [16] first investigated the optimal control problem of consumption and investment with random poisson jumps in 1971, optimal control of stochastic jump diffusion systems have attracted considerable interest from many scholars and economists. Some theoretical and applied research can be founded in minimum principle [18], differential game [20], population growth [9], portfolio selection [8], pension fund control [17], insurance [22] and the references therein.